Lecture 2 Introduction to Linux Notes

Important concepts:

- **Operating System:** An operating system provides all fundamental software features of a computer.
- **Kernel:** The kernel is a core component of an operating system and serves as the main interface between the computer's physical hardware and the processes running on it.
- **Components of an operating system:** Operating systems typically consist of several components, including the kernel, which manages system resources, such as memory and CPU allocation, and provides essential services for other software applications. Other components may include device drivers, system libraries, graphical user interfaces (GUI), and utility programs.
- **Linux:** Linux is a popular open-source operating system kernel that was initially developed by Linus Torvalds in 1991. It serves as the foundation for many different Linux distributions, each of which includes the Linux kernel along with additional software and tools to create a complete operating system.
- **Linux Characteristics:** Some characteristics of Linux include its open-source nature, which allows users to view, modify, and distribute its source code freely. Linux is also highly customizable and adaptable, running on a wide range of hardware platforms from embedded systems to supercomputers. It is known for its stability, security, and performance.
- **GNU Toolchain:** The GNU toolchain refers to a collection of programming tools, libraries, and utilities developed by the GNU Project. It includes compilers (such as GCC), linkers, debuggers, and other tools necessary for software development. The GNU toolchain is often used in combination with the Linux kernel to create complete operating systems.
- **Linux Distribution:** A Linux distribution, or distro, is a complete operating system package built around the Linux kernel. It typically includes additional software, such as system libraries, desktop environments, package managers, and application software. Popular Linux distributions include Ubuntu, Debian, Fedora, and CentOS.
- **What is Ubuntu:** Ubuntu is a widely-used Linux distribution based on Debian. It is known for its user-friendly interface, extensive software repository, and strong community support. Ubuntu comes in several editions tailored for desktops, servers, and other specific use cases.
- **Ubuntu Release cycles:** Ubuntu follows a regular release cycle with a new version being released every six months. Each version is supported for nine months, during which users receive security updates and bug fixes. Every two years, a Long Term Support (LTS) version is released, which is supported for five years on the desktop and server.
- **What is Debian:** Debian is one of the oldest and most influential Linux distributions. It is known for its stability, commitment to free and open-source software principles, and extensive package repository. Debian serves as the foundation for many other Linux distributions, including Ubuntu.
- **Different software licensing models (open source vs closed source):** Software licensing models dictate how software can be used, distributed, and modified. Open-source software allows users to

view, modify, and distribute the source code freely under licenses such as the GNU General Public License (GPL) or the Apache License. Closed-source or proprietary software, on the other hand, restricts access to the source code and typically requires users to purchase a license to use the software. **The 4 Freedoms of Free Software:**

- The freedom to run the program for any purpose.
- The freedom to study how the program works and adapt it to your needs.
- The freedom to redistribute copies so you can help others.
- The freedom to distribute copies of your modified versions to others.
- **Virtualization:** Virtualization is the process of creating a virtual (rather than physical) version of a computing resource, such as a server, storage device, network, or operating system. It allows multiple virtual instances to run on a single physical machine, enabling better resource utilization, flexibility, and cost-efficiency.
- **Hypervisor and types:** A hypervisor, also known as a virtual machine monitor (VMM), is a software layer that enables the creation and management of virtual machines (VMs). There are two types of hypervisors: bare-metal hypervisor and hosted hypervisor
- **VirtualBox:** VirtualBox is a popular open-source hosted hypervisor developed by Oracle. It allows users to create and manage virtual machines on their desktop or laptop computers. VirtualBox supports various guest operating systems, including Linux, Windows, macOS, and others.

List of the main Linux distributions

- Ubuntu
- Debian
- Fedora
- CentOS
- Arch Linux

List of some of the Debian Based Linux distributions

- Ubuntu
- Linux Mint
- elementary OS
- MX Linux
- Kali Linux
- Deepin

List of some of the Red Hat-based Linux distributions

- CentOS
- Fedora
- Red Hat Enterprise Linux (RHEL)
- Oracle Linux
- Rocky Linux

List of some of the Ubuntu Based Linux Distributions

- KDE neon
- Pop!_OS
- Lubuntu
- Xubuntu
- Kubuntu